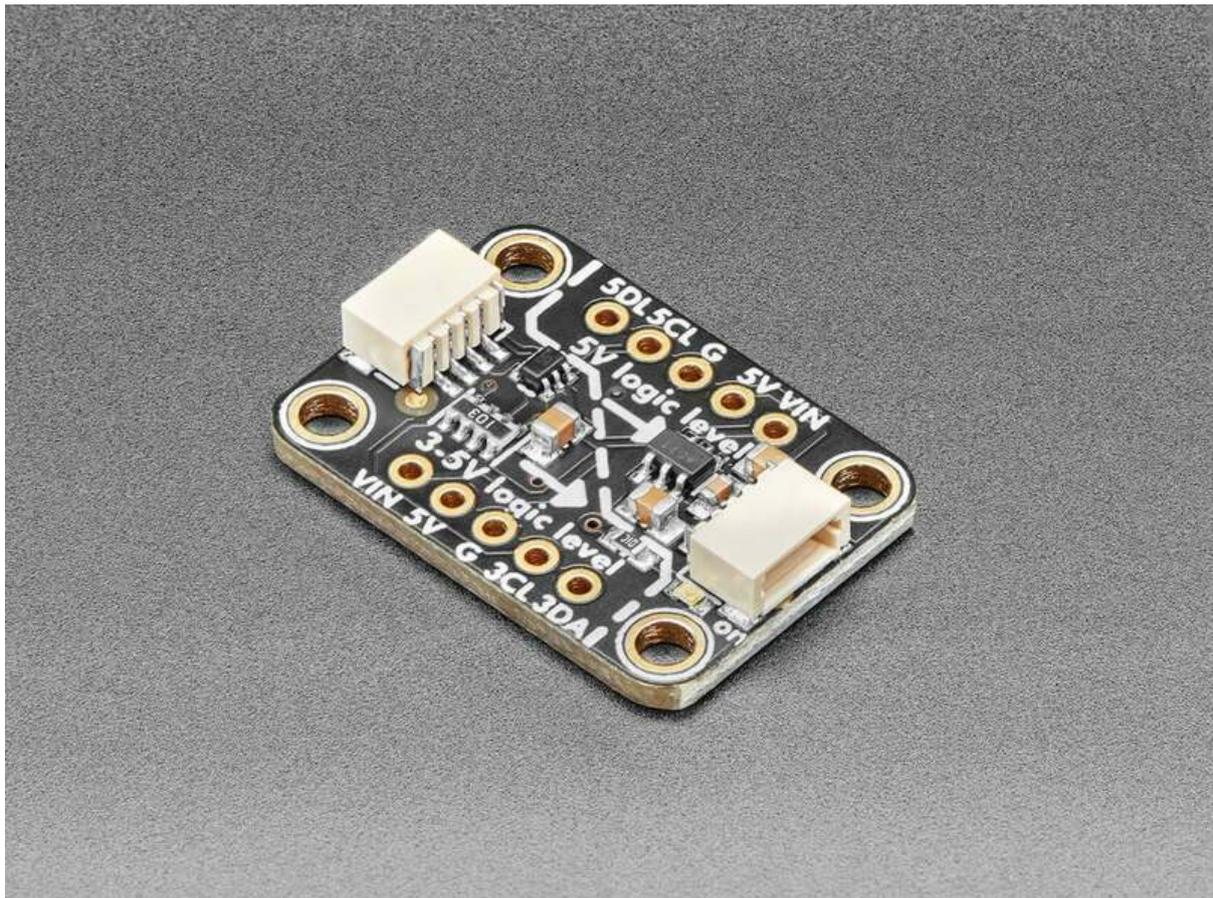




Adafruit QT 3V to 5V Level Booster Breakout

Created by Liz Clark



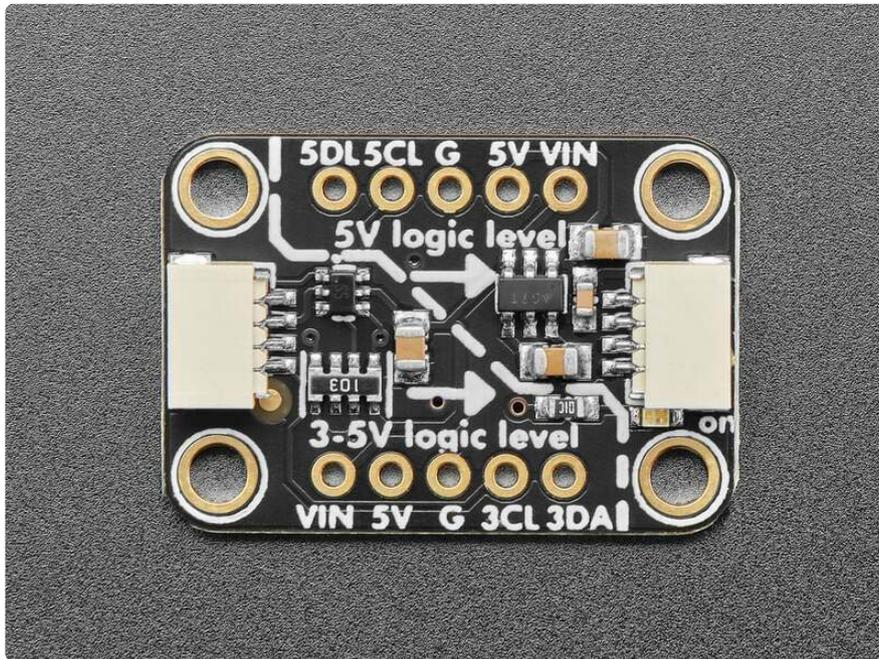
<https://learn.adafruit.com/adafruit-qt-3v-to-5v-level-booster-breakout>

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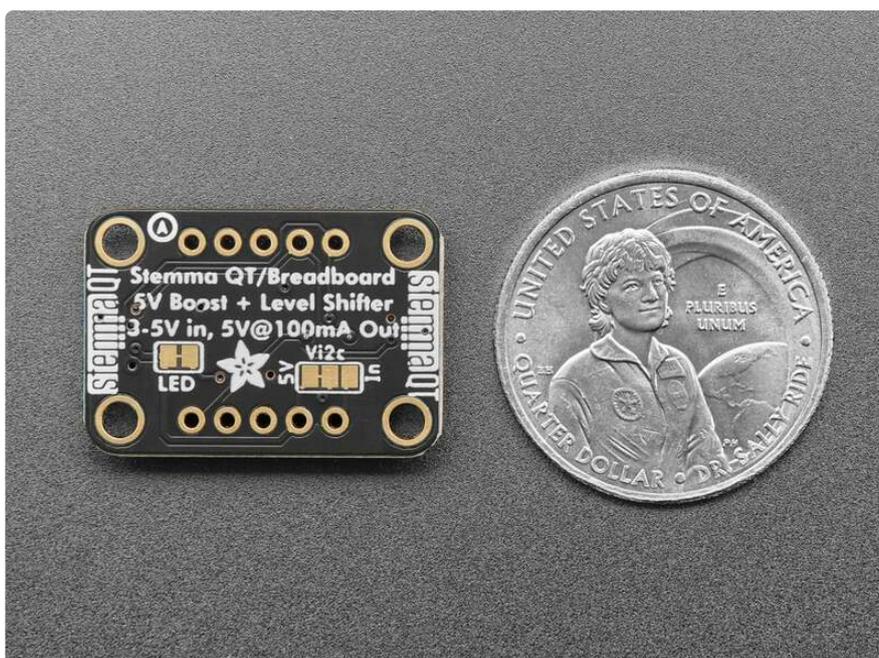
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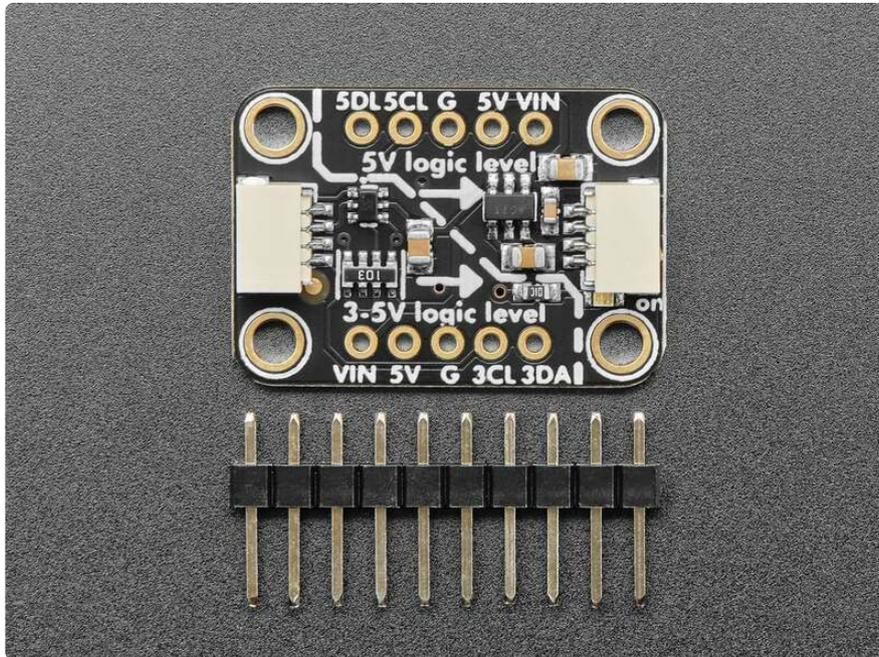
Overview



If you're looking to use the Qwiic / Stemma QT standard for your next project - but you're using a sensor or device that requires 5V power or logic, this board is designed for you! It will let you use the 3V power and logic from your Raspberry Pi, or ARM Cortex microcontroller, and boost/shift it up to 5V for use with older or high-power devices that aren't happy with only 3V.

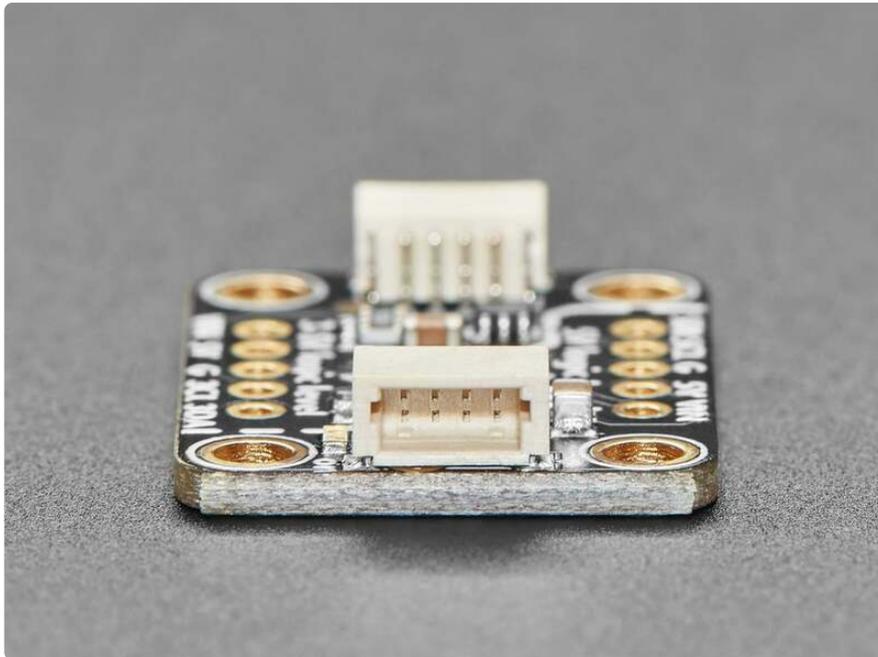


These days, almost every microcontroller / microcomputer board has 3V power and logic: ESP32 series, ATSAMd chips, RP2040 boards, micro:bits, etc! But we still see sensors and devices here and there that really want 5V power or logic. [Like this Sensirion SEN54 which has a small motor \(https://adafru.it/YoE\)](#) with 5V power requirements.



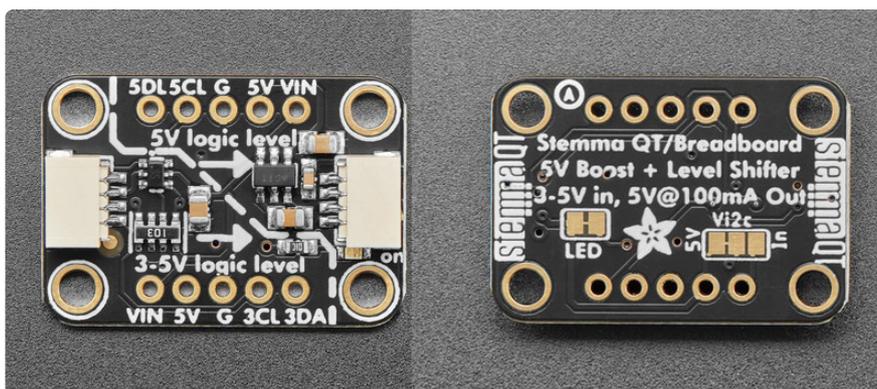
On one side of this board is 3V power and logic level inputs. In the middle is a [5V charge-pump boosting regulator that can provide 100mA continuous \(250mA peak\) \(https://adafru.it/18mB\)](#) plus level shifting circuitry. On the opposite side is the same I2C traffic but now safely shifted up to 5V. If you happen to be using a board that wants 5V power, but 3V logic I2C, there's a solder jumper on the back you can cut/solder to set the output logic level to unshifted 3V.

It's simple but very effective! You also get breadboard breakout pins for breadboard usage so it can also be used as a QT-to-perfboard adapter. [If you need something that does 5V to 3V down-conversion, we have that in the shop as well. \(http://adafru.it/5637\)](#)



The [STEMMA QT connectors](https://adafru.it/JqB) (https://adafru.it/JqB) on either side are compatible with the I2C connectors. This allows you to make solderless connections between your development board and the QT Shifter or to chain it with a wide range of other sensors and accessories using a [compatible cable](https://adafru.it/JnB) (https://adafru.it/JnB) **QT Cable is not included, but we have a variety in the shop.** (https://adafru.it/17VE)

Pinouts



Power Pins

- **VIN** - this is the power pin. To power the board, give it the same power as the logic level of your microcontroller - e.g. for a 5V microcontroller like Arduino, use 5V.

- **5V** - this is the 5V output from the charge-pump boosting regulator. It can provide 100mA continuous and 200mA peak.
- **G** - common ground for power and logic.

I2C Logic Pins

- **3CL** - I2C clock pin for incoming 3V logic, connect to your microcontroller I2C clock line. It's meant as the 3V logic input, but you can use 3-5V logic. There is a **10K pullup** on this pin.
- **3DA** - I2C data pin for incoming 3V logic, connect to your microcontroller I2C data line. It's meant as the 3V logic input, but you can use 3-5V logic. There is a **10K pullup** on this pin.
- **5CL** - I2C clock pin for outputting 5V logic, connect to your microcontroller I2C clock line. It is level shifted to output 5V logic. There is a **10K pullup** on this pin.
- **5DA** - I2C data pin for outputting 5V logic, connect to your microcontroller I2C data line. It is level shifted to output 5V logic. There is a **10K pullup** on this pin.
- **STEMMA QT** (<https://adafru.it/Ft4>) - These connectors allow you to connect to dev boards with **STEMMA QT** connectors or to other things with [various associated accessories](#) (<https://adafru.it/JRA>).
 - The connector behind the arrows on the silk is for the 3V logic input
 - The connector being pointed to by the arrows on the silk is for the 5V logic output

The pin labeled 5DL is a typo, it should say 5DA.

Power LED and LED Jumper

- **Power LED** - In the lower right corner, below the STEMMA connector, on the front of the board, is the power LED, labeled **on**. It is a green LED.
- **LED jumper** - This jumper is located on the back of the board. Cut the trace on this jumper to cut power to the "on" LED.

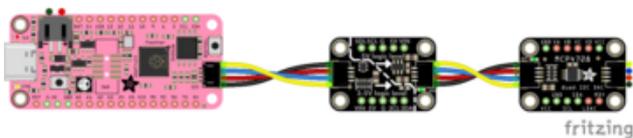
Vi2c Jumpers

If you happen to be using a board that wants 5V power, but 3V logic I2C, there are jumpers located on the back, labeled **Vi2C**, that you can cut/solder to set the output logic level to unshifted 3V.

- **5V jumper** - This jumper is located on the back of the board. Cut the trace on this jumper to set the output logic level to unshifted 3V.
- **In jumper** - This jumper is located on the back of the board. Solder this pad to the center **Vi2c** pad to set the output logic level to **VIN**.

Wiring

To use the 3V to 5V booster breakout, plug a 3V microcontroller power, ground, SCL and SDA pins into the 3V logic inputs. Then, wire up a breakout board to the 5V logic outputs. The breakout board will now receive 5V logic.

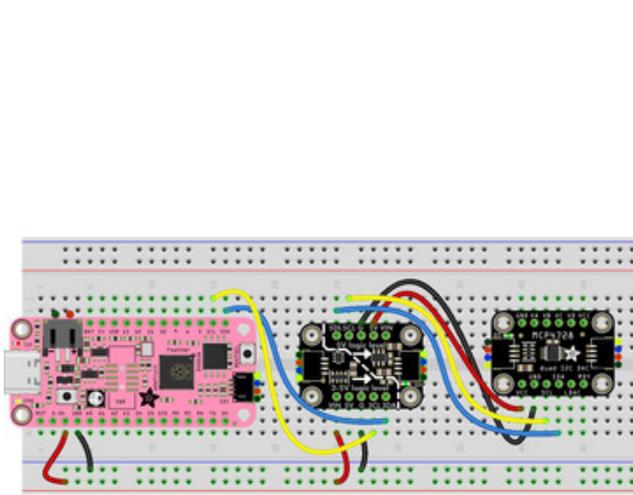


You can use STEMMA QT cables to connect to the logic booster.

Plug the **3V microcontroller** into the **3V input STEMMA QT port** located behind the arrows on the board silk.

Plug a STEMMA breakout board into the **5V output STEMMA QT port** located in front of the arrows on the board silk.

You can also use standard **0.100" pitch** headers to wire it up on a breadboard:



3V Logic Input

Board 3V to booster VIN
Board GND to booster G
Board SCL to booster 3CL
Board SDA to booster 3DA

5V Logic Output

Booster 5V to breakout VIN
Booster G to breakout GND
Booster 5DL to breakout SDA
Booster 5CL to breakout SCL

Downloads

Files

- [AP3602A Datasheet \(https://adafru.it/18mC\)](https://adafru.it/18mC)
- [EagleCAD PCB Files on GitHub \(https://adafru.it/18mE\)](https://adafru.it/18mE)
- [3D Models on GitHub \(https://adafru.it/18mF\)](https://adafru.it/18mF)
- [Fritzing object in the Adafruit Fritzing Library \(https://adafru.it/18na\)](https://adafru.it/18na)

Schematic and Fab Print

